

Workflow

Assignment 2

General / Tips

Setup ArcGIS
Environment

Follow the steps outlined in the document Lab Fundamentals in LMS to set up your project environment.

File Save

Save your work often as the ArcPro app can crash, especially when working with large files.

GEOM20013_A1_
Description

Refer to document GEOM20013_A2_Description for the description and assessment details for this assignment.

Task 1

Raw Data Folder

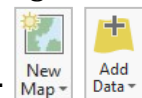
Beginning the exercise – Adding SA2 layer for state of Victoria

Make sure you have copied the contents of zipped files into your Data folder as stated in Lab Fundamentals, and un-zipped the folder

Adding First Layer

In ArcPro > Insert tab > New Map. Once the map loads, go back Add Data in the Map tab.

Add the layer SA2_2016_AUST from your Data folder.



SA2 stands for Statistical Area Level 2. Refer to the description file for further details.

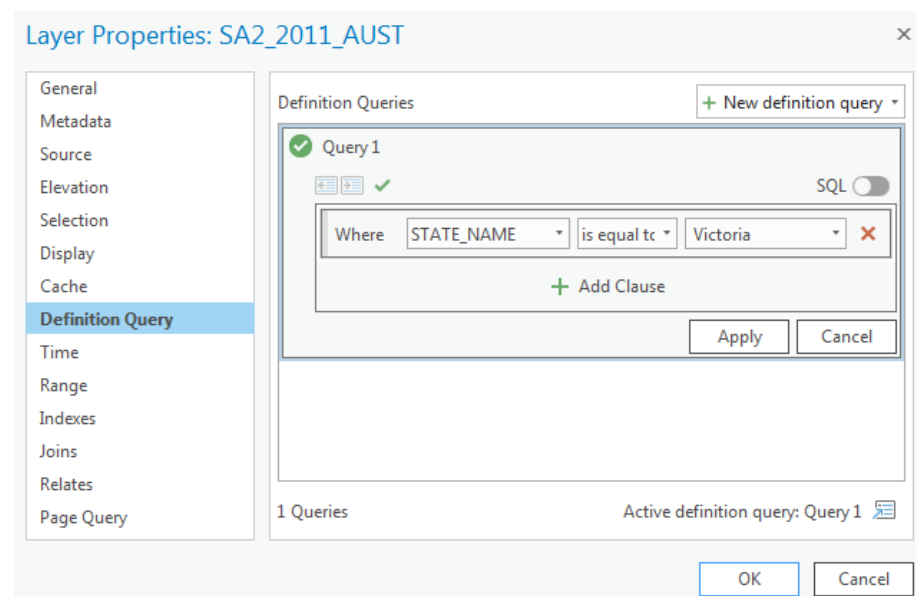
Selecting an Area of
Interest

Filter your dataset to just show Victoria.

Right click SA2_2016_AUST layer in the left-hand content pane, Click **Properties** > click **Definition Query**

Click **Add Clause**, Query will be:

"STE_NAME" = 'Victoria', as per below:

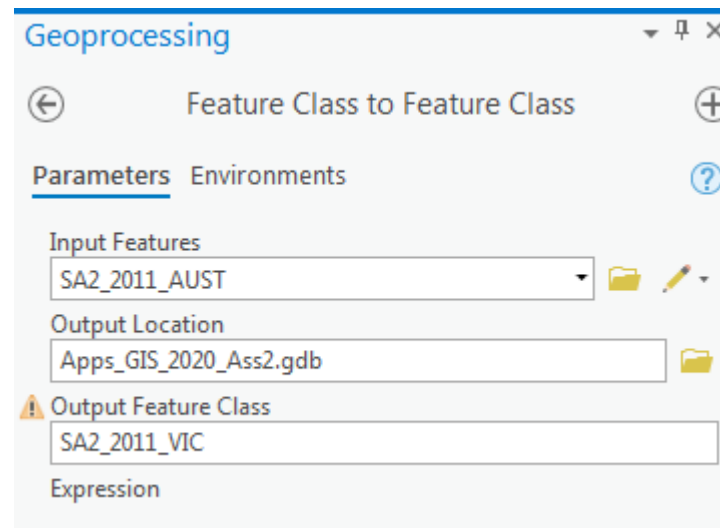


Click Add then OK, you should now only see Victorian SA2 areas.

Saving SA2s of Victoria

In Table of Contents on the left, right click on SA2_2016_AUST layer, *Data > Export Features*

This will pop up in the right-hand pane.



Save in your data in the project Geodatabase, this will come up as the default location

Name the feature SA2_2016_VIC

Because you applied the definition query on the layer it will only export Victorian SA2 areas.

Task 2

Choosing data to analyse

Additional raw data is needed for analysis. One good source is the Census Datapacks from the Australian Bureau of Statistics (ABS). <https://datapacks.censusdata.abs.gov.au/datapacks/>

One of the datapacks is provided for you in LMS – **2016_TSP_SA2_for_Vic_short-header.zip**

Remember to extract this archived zip file before using.

This folder contains the important raw data from the 2006, 2011, and 2016 Census.

This folder contains important information regarding how to interpret and choose the files you require. Open the files in this folder and try to understand what you are dealing with before you proceed.

2016_TSP_Sequential_Template.xlsx is a very useful reference file.

Additional technical information regarding the files and regions in the Datapack.

2016 Census GCP
Statistical Area 2 for
VIC

Metadata

Readme

Choose your CSV file

Once you understand what you are dealing with, pick the type of information you would like to work with in this assignment and its

corresponding CSV file. Feel free to edit and remove any unnecessary columns in the CSV if you like, but remember to save it as a CSV file once you are done.

For this example as stated in the description pdf file, we will be using information related to *Person Characteristics*, file 2016Census_T01_VIC_SA2.csv

Task 3

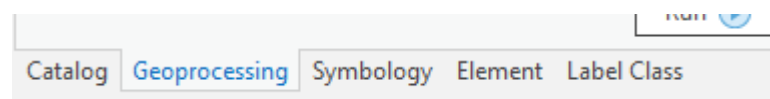
Back to ArcPro

Converting SA2 area codes from numeric to text field

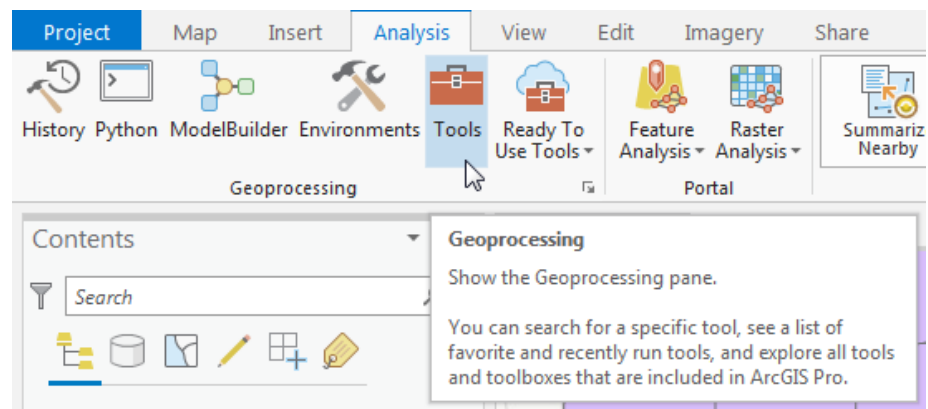
Open your ArcPro assignment 2 project from the above Task 1.

You will need to add the census data you need into your Geodatabase to be used with the SA2 spatial layer.

In bottom of the right-hand pane click geoprocessing.



If it is not there go to the top ribbon and click **Analysis** and then click **Tools**



Then the geoprocessing will show up on the right hand pane.

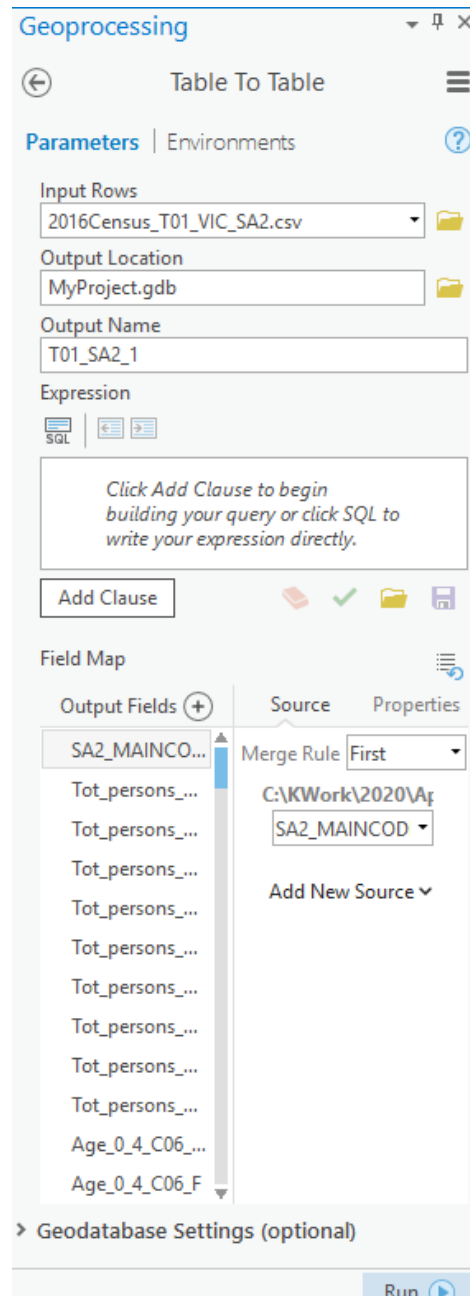
Bringing in CSV data

In the geoprocessing search box, search for the **Table to Table** tool.

Select your CSV with the census data

Select your project Geodatabase

Choose output table name and click Run to produce the table



Convert Region_ID to Text

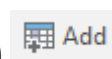
To join the SA2 spatial layer and the table data, both tables need a Unique ID to join on.

In the SA2 spatial layer this is called **SA2_MAIN**

In the table it's called **SA2_MAINCODE**

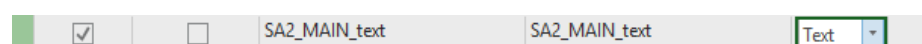
Right click the census data table and click open

On the top left of the table click Add (next to Field:)



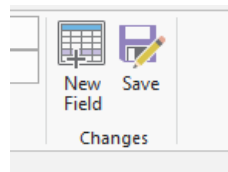
This will list all the fields (attributes), we can see here the SA2_MAINCODE is numeric

Add a new field at the bottom called **SA2_MAIN_text**, type TEXT



Calculating new field

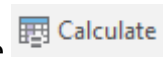
Click Save up the top



Close the fields editor (click X on top of fields table)

Go back to your table data (e.g. T01_SA2_1)

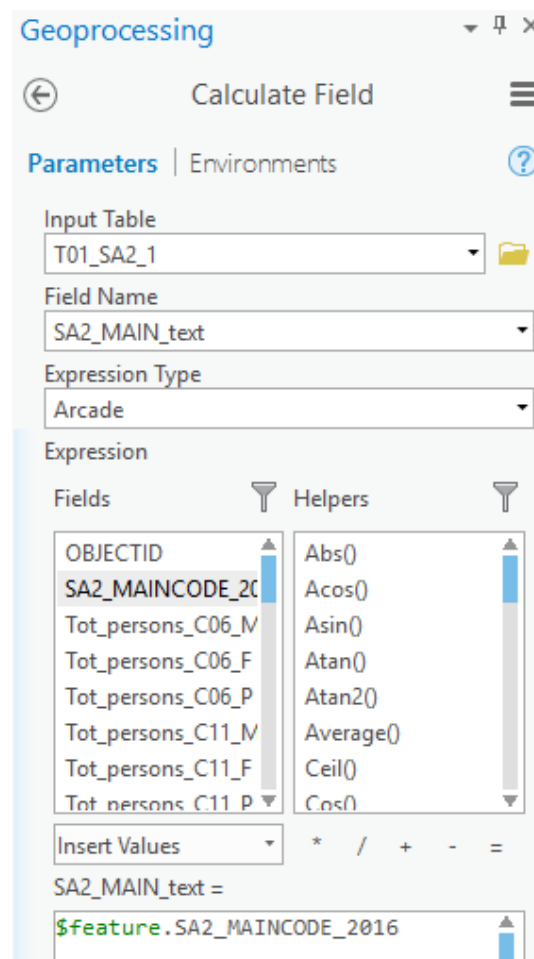
On the top of the data click Calculate



A new tool will pop up in the right-hand pane

Choose the Field Name to be **SA2_MAIN_text**Choose the SA2_MAIN_text = value to be *\$feature.SA2_MAINCODE*

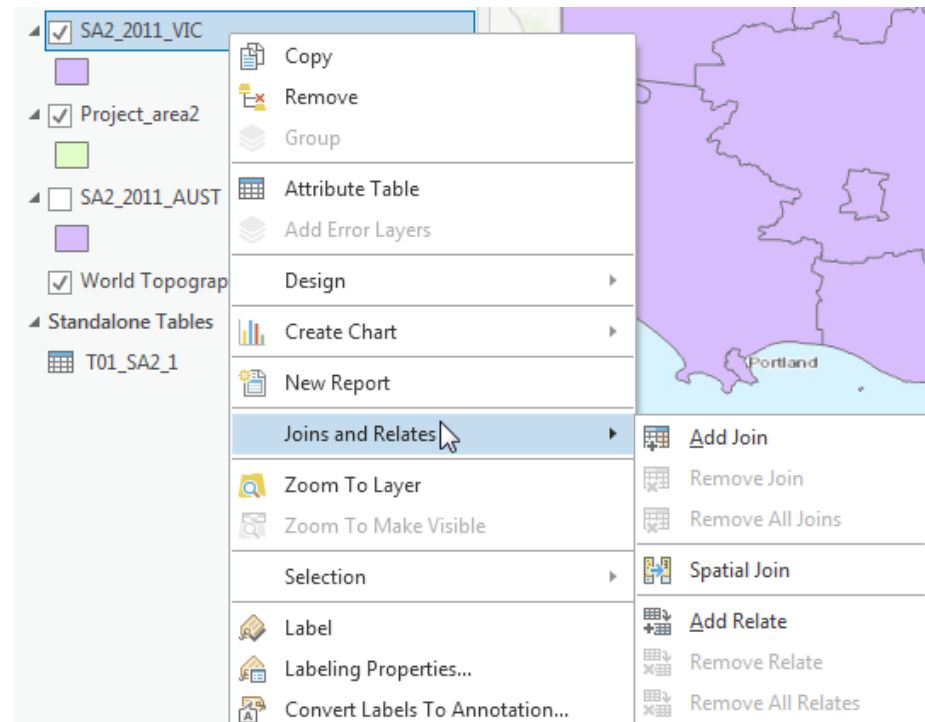
(Do this by just double clicking the list of fields)



This will then populate the **SA2_MAIN_text** column with the SA2_MAINCODE's but of type text, new column will be at very right of table

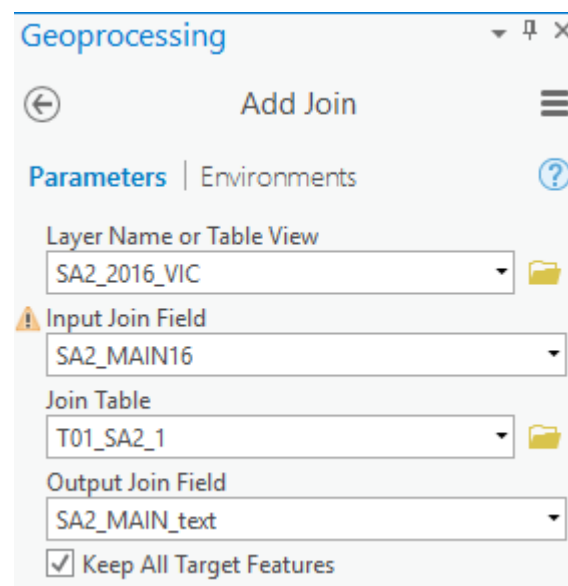
Joining Layers

Right click on the **SA2_2016_VIC** spatial layer > Click joins and relates > Add Join



Choose SA2_MAIN as the spatial layer Field

Choose SA2_MAIN_text as the Output join field



If you look at the SA2_2016_VIC layers attribute table (right click layer > Attribute table) you will see all the census data there

1:147,751

106,720,521.5,801,302,459 m

Selected Features 0

Victoria 1

TOT_SA2_1

Fields

Add

Delete

Calculate

Selections

Switch

Layers

SA2_NAME	STATE_CODE	STATE_NAME	AREA_SQKM	Shape_Length	Shape_Area	OBJECTID	region_id	Tot_persons_C01_M	Tot_persons_C01_F	Tot_persons_C01_P	Tot_P
Wangaratta Region	2	Victoria	3587.25817	461.464.32051	158467949.59582	47	204021987	4790	4375	9165	
Shepparton	2	Victoria	4.144638	36275.526391	42.84776.123.845	235	210012121	4181	4128	8309	
Chomelake Park	2	Victoria	22.203662	23133.887845	221.96954.70123	275	211051275	4396	4458	8854	
Ringwood North	2	Victoria	4.730897	11449.500132	4729940.301213	268	211031268	4424	4094	8518	
Flora Hill - Spring Gully	2	Victoria	13.200516	17289.731225	13209017.128453	21	202011021	3921	4565	8486	
Flemington	2	Victoria	1.580799	6612.198169	1580827.378526	115	206011115	3821	4117	7938	
Phillip Island	2	Victoria	106.573054	104853.111515	100550966.384445	91	205010901	3444	3628	7072	
Mount Evelyn	2	Victoria	16.985762	22045.401033	16984597.619821	283	211051283	4451	4452	8903	
Pascoe Vale South	2	Victoria	2.969805	8434.614577	2969841.052155	109	206011109	4090	4276	8366	
Bundoora - East	2	Victoria	4.075082	9758.631886	4074733.54452	196	209011196	4215	4371	8586	
Mount Dandenong	2	Victoria	81.899679	68855.885086	81875364.419305	282	211051282	4711	4648	9359	
Lakes Entrance	2	Victoria	211.549449	88136.917488	21361.3074.401295	84	205020984	4185	4128	8313	
Shepparton Region	2	Victoria	1028.722412	274626.610574	828511224.110563	419	216010419	4886	4563	9449	
Newtown (Vic)	2	Victoria	5.791361	11379.709277	5794367.058813	46	203010446	4507	4952	9459	
Castlemaine	2	Victoria	81.929178	52347.081096	8398817.447028	27	20301027	4369	4517	8886	
Upwey - Tecoma	2	Victoria	8.891215	16406.619487	8888819.067289	284	211051284	4906	5013	9919	
Kensington	2	Victoria	2.144994	6668.375966	2147017.981543	121	206041121	3614	3817	7431	
Surrey Hills (East)	2	Victoria	3.327952	8139.988546	3327565.504319	167	207010167	4105	4088	8193	
Vermont	2	Victoria	4.609476	9672.805407	4608635.300005	272	211041272	4137	4718	8855	
Leongold	2	Victoria	27.828294	30441.094609	27939751.663453	44	203010444	3950	4117	8067	
Warrandyte - Wonga	2	Victoria	45.759123	57818.706816	45749745.048166	262	211010262	4827	4856	9683	
Belgrave - Selby	2	Victoria	55.614852	44279.177983	55618978.502512	274	211051274	5126	5456	10582	
California Gully - East	2	Victoria	33.030266	32463.107366	33054941.314828	19	20201019	4177	4073	8250	
Dingley Village	2	Victoria	7.243484	11756.50464	7242151.796079	313	212041313	4978	5032	10010	

Task 4

Deciding on Trend

New Columns for Trend

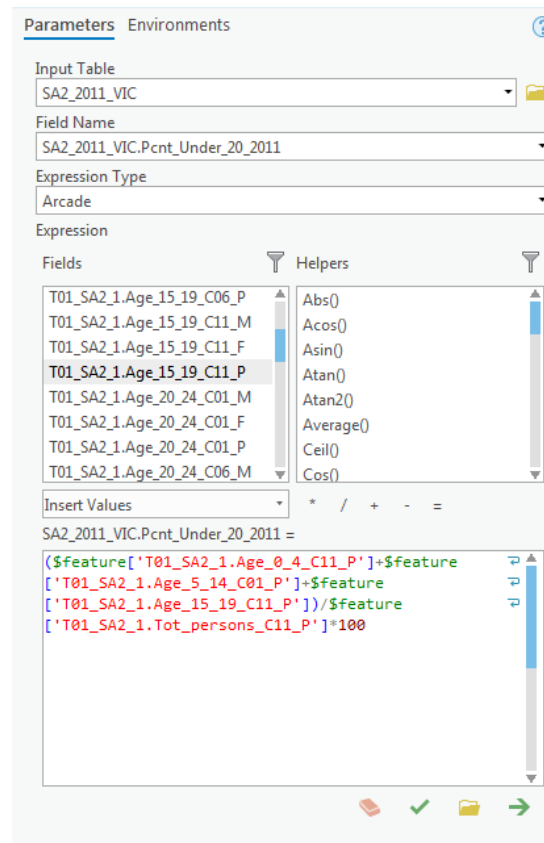
Calculating statistics for the trend in each SA2 area

Head to the SA2_2016_VIC layer, add a new field and then do field calculate field to calculate what trend you want to show (e.g. percent of people under 20, more useful than just showing the raw number of people under 20). Do this for each census year, 2006, 2011 and 2016..

For this exercise's example, we use the Percentage of people under the age of 20, for 2006, 2011 and 2016. To achieve this, 3 new fields (3 columns) for each year's % will be created.

Make a new field in your SA2_2016_VIC spatial layer, call it **Pcnt_Under_20_2011** or something relevant, click Save at the top

Then on your spatial layer, calculate field, select your new field and then compute percent of people under 20 for 2011 for each SA2 region



The equation should look like:

$$\frac{(\$feature['T01_SA2_1.Age_0_4_C11_P'] + \$feature['T01_SA2_1.Age_5_14_C01_P'] + \$feature['T01_SA2_1.Age_15_19_C11_P'])}{\$feature['T01_SA2_1.Tot_persons_C11_P']} * 100$$

The above step is repeated for 2006 and 2016.

Task 5

Choosing Level 2 Statistical Areas (SA2)

As mentioned in the lab description pdf file, you are required to choose three SA2 areas for this assignment. You will be using the joined layer from the previous Task 4 – **SA2_2016_VIC**.

Choosing Project Area:
Select by Attributes

Option 1: Select from the attribute table. Right click on the SA2_Vic layer on *Table of Contents*, click on *Attribute Table*. Then select the SA2s of your choice for the project area, by clicking on grey box at start of the row, hold Ctrl to select multiple rows.

OBJECTID	Shape	SA2_MAIN	SA2_NAME	STATE_CODE	STATE_NAME	AREA_SQKM	Shape_Length	Shape_Area	OBJECTID	region_id	Tot_persons
275	Polygon	211051275	Charmside Park	2	Victoria	22.202662	23323.887845	22196954.70123	275	211051275	
268	Polygon	211051268	Ringwood North	2	Victoria	4.730897	11449.560132	4729940.361213	268	211051268	
21	Polygon	202011021	Flora Hill - Spring Gu...	2	Victoria	13.200516	17289.731225	13209617.128453	21	202011021	
115	Polygon	206031115	Flemington	2	Victoria	1.580799	6612.198169	1580827.370526	115	206031115	
91	Polygon	205031091	Phillip Island	2	Victoria	100.573054	104653.112515	10050966.384445	91	205031091	
283	Polygon	211051283	Mount Evelyn	2	Victoria	16.889762	22045.401033	16884597.618821	283	211051283	
109	Polygon	206011109	Pascoe Vale South	2	Victoria	2.889805	8434.614577	2888843.052355	109	206011109	
196	Polygon	209011196	Bundoora - East	2	Victoria	4.075082	9758.651086	4074733.54452	196	209011196	
282	Polygon	211051282	Mount Dandenong ...	2	Victoria	81.899679	68855.869086	81875364.419935	282	211051282	
84	Polygon	205021084	Lakes Entrance	2	Victoria	214.048649	88336.917488	213913874.401295	84	205021084	
419	Polygon	216031419	Shepparton Region ...	2	Victoria	1028.722412	274826.603574	628551234.110163	419	216031419	
46	Polygon	203021046	Newtown (Vic.)	2	Victoria	5.791361	11379.709277	5794507.058813	46	203021046	
27	Polygon	202021027	Castlemaine	2	Victoria	83.829178	52347.065106	83868617.447028	27	202021027	

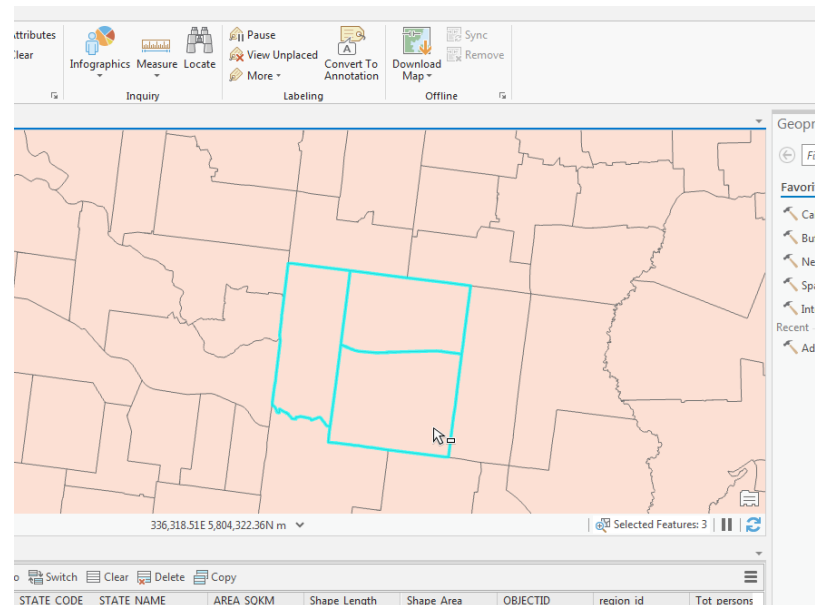
Choosing Project Area:
Select on Map

Option 2: Selecting spatially from layer. Have only the SA2_Vic layer visible (only SA2_2016_Vic layer should be checked in *Table of Contents*).

Go to the top ribbon, make sure it is on Map, then click **Select**

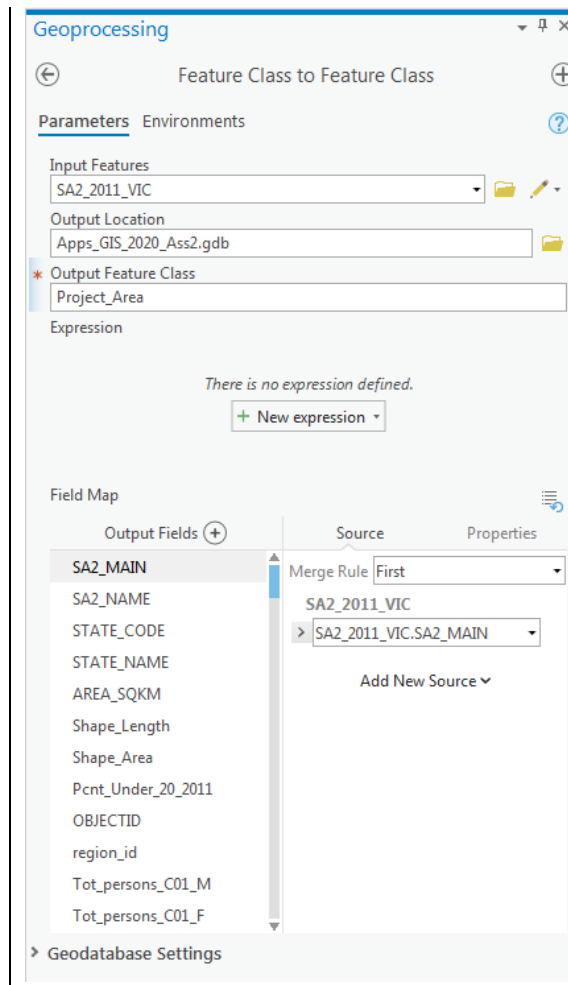


Then select on the map click and drag to select your SA2 regions



Exporting Project Area

Right click on the SA2_Vic layer and then *Data > Export Data*. Save in your default project geodatabase.

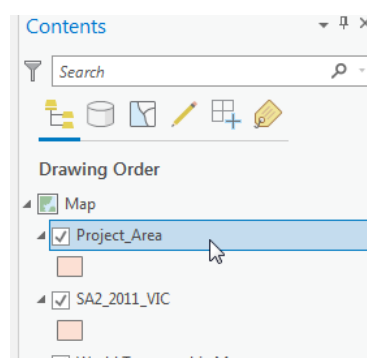


Task 6

Labelling Layer Info

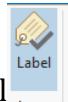
Symbology

To label your SA2s with your trend value, percentage, or population etc. Click on the layer you want to label, in the left contents pane.



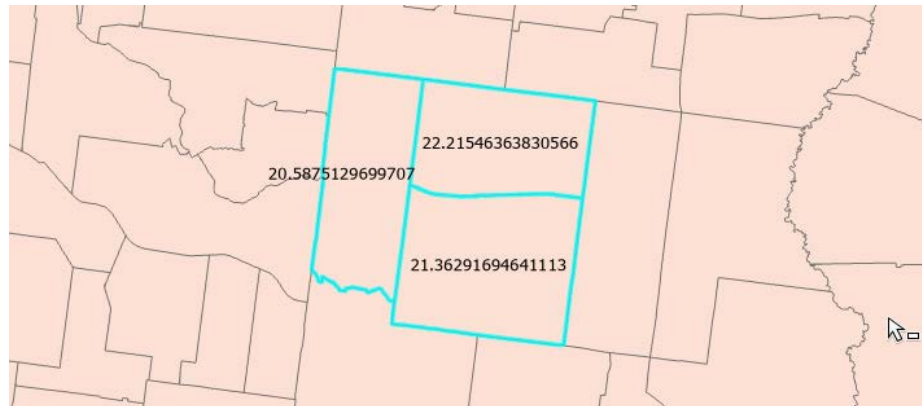
Then in the top ribbon click Labelling

Choose the field you want to label (e.g the Percent of people under 20) you just calculated.



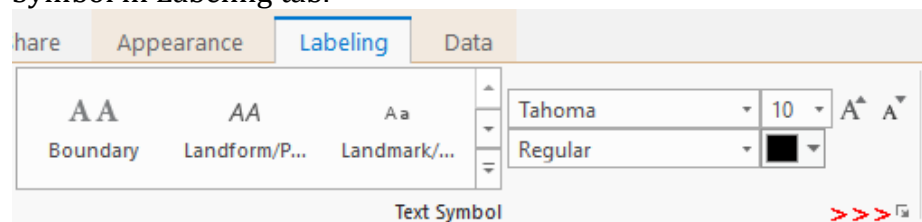
Then click Label

Your areas will then be labelled with your figures.



But it will look better with only 2 decimal places and the percent symbol, because it is a percent value.

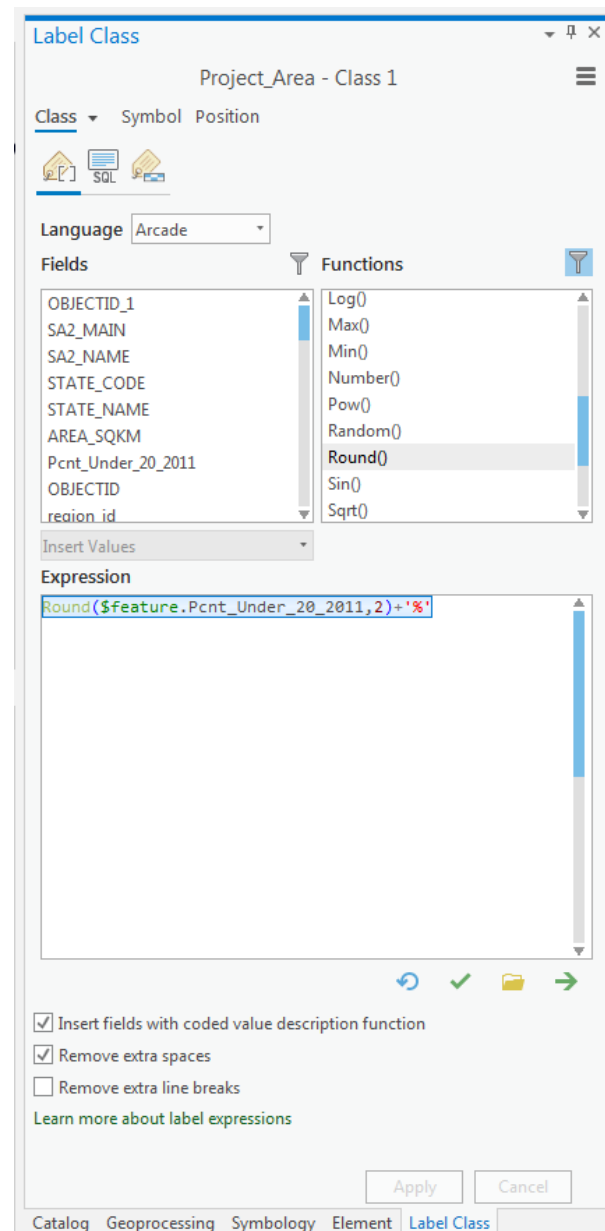
On the right-hand pane, down the bottom, click Label Class. If this is missing, select the expand button at the bottom right of Text Symbol in Labeling tab.



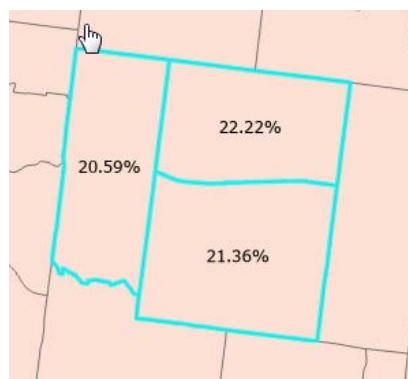
Then you can round the number with the round command and add the percent symbol on the end with the following code:

```
Round($feature.Pcnt_Under_20_2011,2)+'%'
```

Then click Apply



Then it will be labelled as a percent

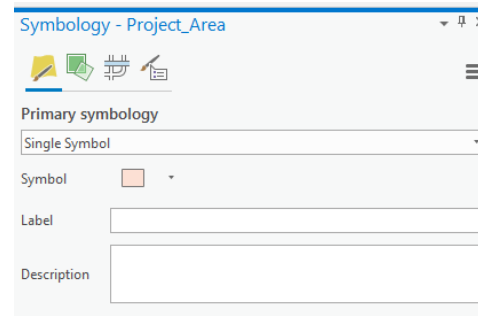


Colour Scale Symbology

To display a range of colours to represent a scale, eg. your trend, percentage, population density etc.

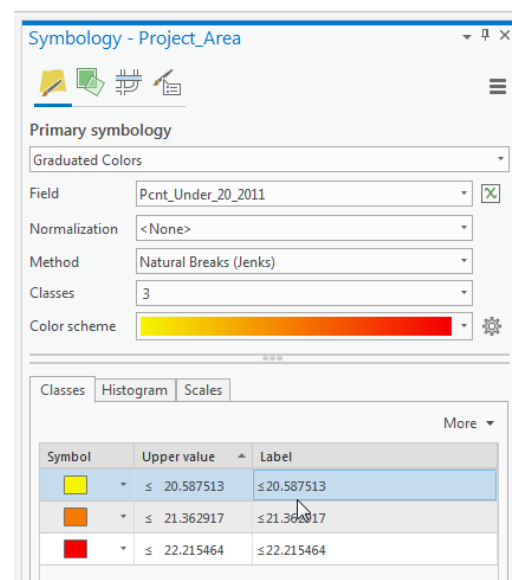
Right-click on your Project layer in the left-hand contents and select Symbology.

Then in the right-hand pane, the following settings will appear.

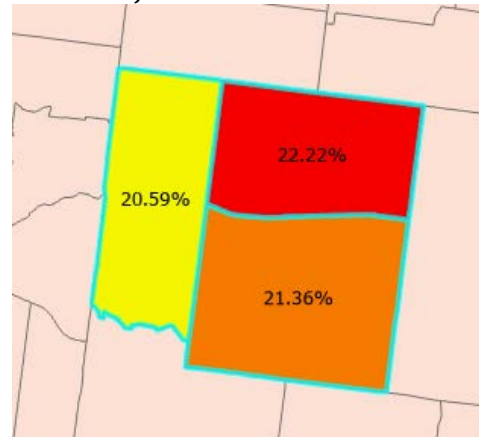


Then choose Graduated Colours, Choose your Field you want to symbolise (the same one you labeled)

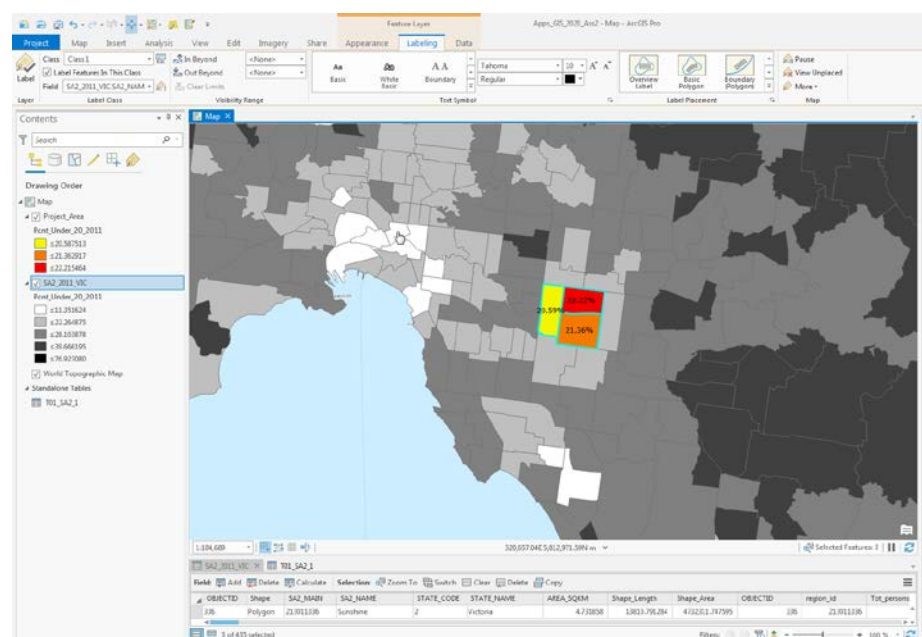
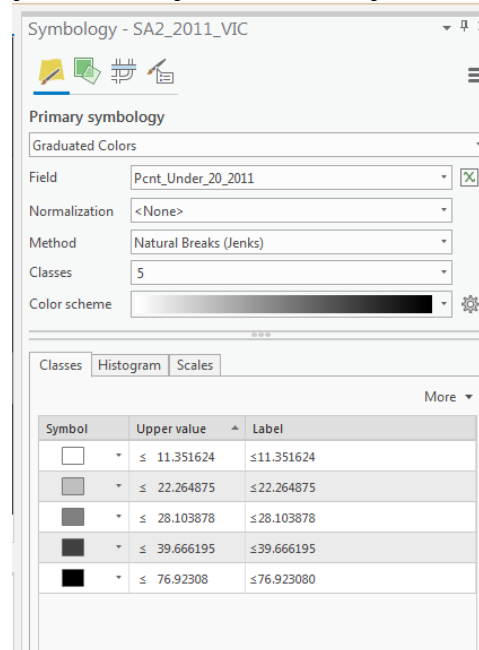
And choose a colour palette



Your Project Area will then be coloured

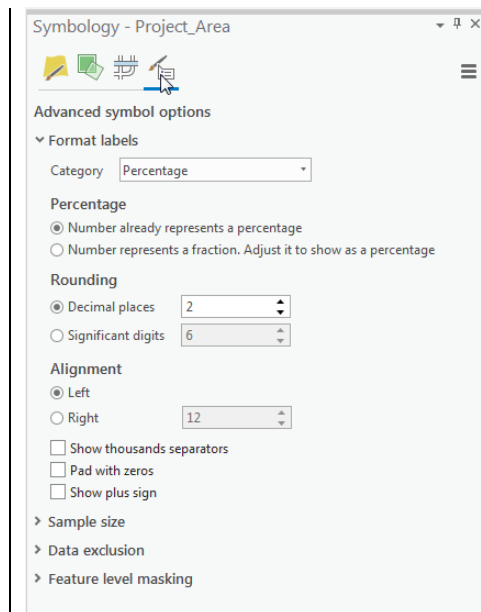


Then colour the rest of the state with the same attribute but different colour. Choose your SA2_2016_VIC layer in the left-hand pane and repeat the same process with a different colour.

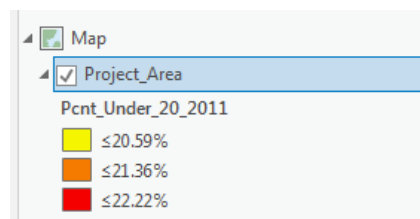


Formatting the legend

You may also want only 2 decimal places and the percent symbol in the legend (the left-hand pane). Go to the symbology of the layer where this is, then click on the symbol editing options. Click Format labels.



Change the category to percentage and 2 decimal places. Then the legend will show that.

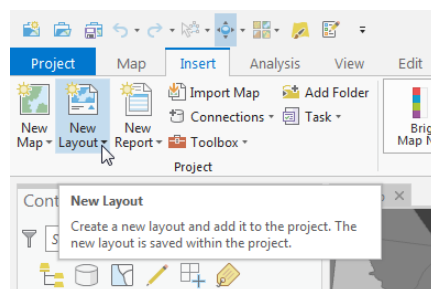


Task 8

Presenting Maps

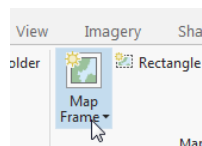
Creating Maps

Click insert on the top ribbon and click new layout.



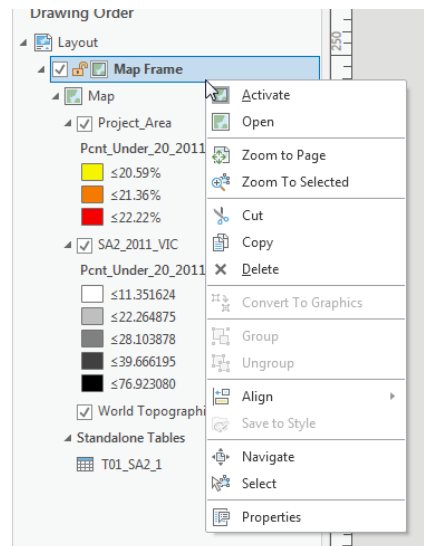
Can choose any size, (A3 landscape suggested for Victoria)

Click new Map Frame to insert your map.

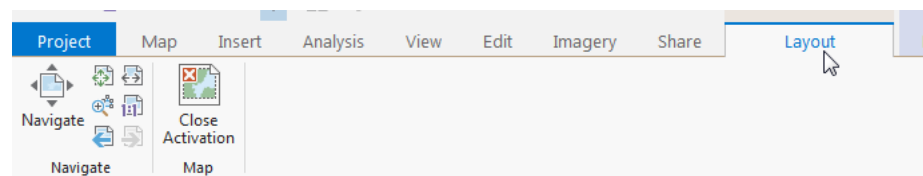


Tip: Use *Zoom-in*, *Zoom-out*, *Pan*, *Zoom to Extents* to manage the scale and extent of your map.

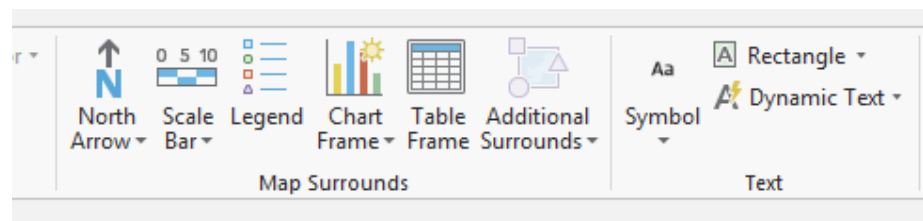
To change the scale of your map (zoom on the data) you need to right click the map frame in the left-hand pane and click Activate.



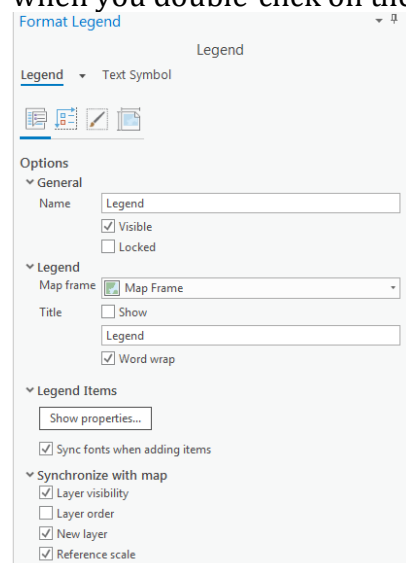
To finalise the scale, you need to go to the top and click, Layout then Close Activation.



Insert from the top menu to implement BOLTS – Border, Orientation, Legend, Title, and Scale.



Elements like the Legend can be edited in the right-hand pane when you double-click on them in the map frame.

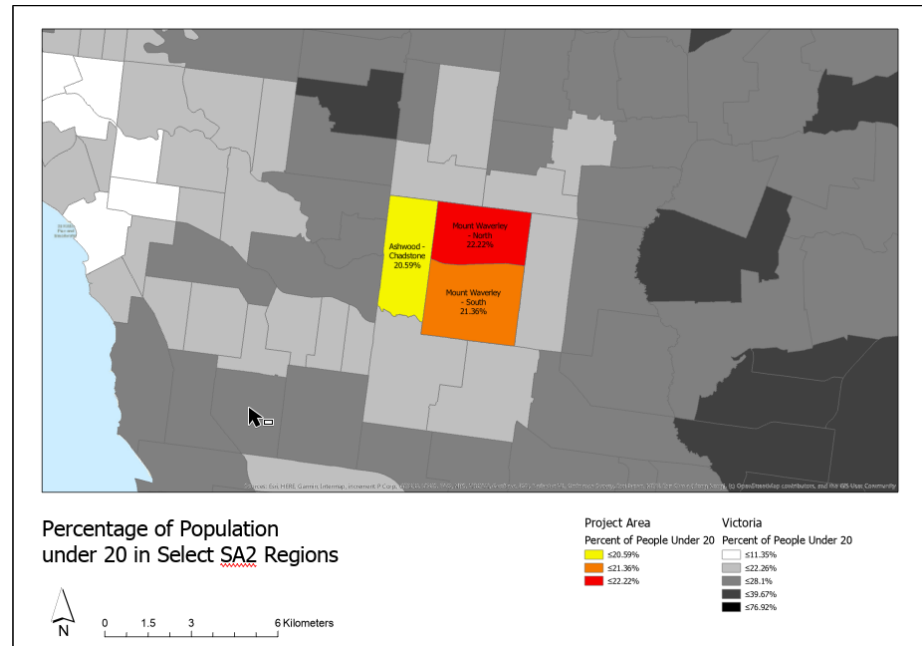


This will give you a good start for the assignment and is the minimum you are required to do. You should look at presenting one or more trends with good symbology and perhaps show some comparisons for the rest of Victoria or Melbourne.

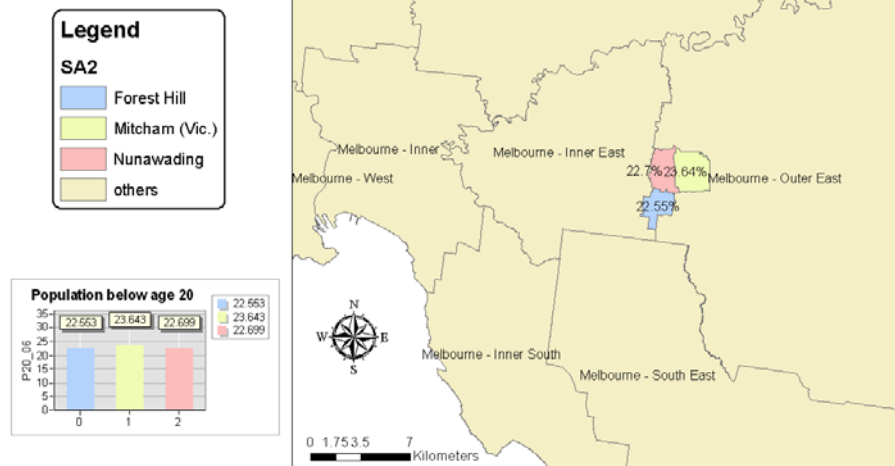
Play around with the layer properties, symbology, display, labels etc. for good representation. Try and present your infrastructure and services in a meaningful way for you to make better recommendations to the local and state governments. If you cannot find spatial data relevant to your trend, try and find documentation about your SA2 and the services and infrastructure they have, even non-spatial data, so you can discuss it in your report.

The main map to create is that of your trend. You should aim to present **choropleth maps** similar to this, showing your trend for each year, or the change between the years, or even three different maps for 2006, 2011 and 2016.

Some examples:



Percentage Population Below Age 20 in selected SA2s (2006)



Remember to save your work often!

Essential Reading

http://wiki.gis.com/wiki/index.php/Choropleth_map